Natural History Notes.

Chemical Action of Plant Life.—In a recent number of *Nature*, Prof. Klebs describes an interesting lecture experiment, which illustrates the chemical functions performed by plants. He states that the capability of algæ to render the water in which they live alkaline during the fixation of carbon by them under the influence of light may be easily demonstrated by the addition of a little phenolphthalein solution.

As the fixation proceeds, the water gradually assumes a deep red tinge, which as gradually disappears again when light is excluded. The explanation offered is that the algæ not only take up any free carbonic acid that may be present absorbed in the water, but decompose any acid carbonates that may be within reach. In darkness, the reverse takes place.

Preservation of Plants in Alcohol.—Many plants assume a brown color when placed in alcohol for preservation, and to prevent this change Professor De Vries, of Amsterdam, proposes (*Nature*) to add 2 parts of ordinary hydrochloric acid to every 100 parts of alcohol. Parts of plants brought into this liquid while yet living become absolutely colorless, or nearly so, after the alcohol has been sufficiently often renewed. Such parts as are already brown usually retain their color. By this method colorless specimens may be made of such plants as *Orobanche* and *Monotropa*, which, when treated in the ordinary manner, always become of a dark brown tint. There are only some species with coriaceous leaves that cannot be treated with success with the acid alcohol. Colorless specimens of these must be made by plunging them into boiling alcohol. Professor De Vries has found the proportion of acid above stated to be best suited for the purpose, and specimens may remain for months, perhaps forever, in the acid alcohol without injury. The alcohol, after having been used, may be decolorized by distillation after neutralization with ammonia or carbonate of soda.

The Leap of the Salmon.—The power that the salmon possesses of ascending waterfalls is the subject of some interesting details by Prof. A. Landmark, director in chief of the Norwegian fisheries. He states that in certain cases salmon have been observed to ascend to a distance of 16 feet, and he feels this to be true from having seen them leap over two masts which were 3½ feet apart, and which had been placed across the river at about 16 feet above water, at Hollefoss, upon the Drams, at Haugsend. He says, even, that certain salmon, on ascending a vertical fall, are capable, if they meet the fall at right angles with the muzzle, of remaining a minute or two in the midst of the mass of falling water, if they do not succeed in passing over the fall at a single leap.

Fruit Development.—The cause of the fertility produced in fruit trees by bending the twigs at an acute angle has been investigated by Prof. Sorauer. He finds that the bark on the lower surface of the twig, below the bend, is thrown into transverse folds, here and there detached from the wood. New woody tissue is formed in these cavities, which is filled with starch grains, and after this there is a formation of new woody tissue of a normal character, but always thicker there than elsewhere, and especially on the convex upper surface. The mass of woody tissue checks the flow of water toward the tip of the branch, to the great advantage of the bud directly beneath, which is thus more likely to develop as a fruit bud.

Edible Fungi.—In the Students' Society for Natural Sciences at Upsala, Herr C. T. Morner has contributed a careful analysis of the following edible fungi, viz.: *Agaricus campestris*, *Lycoperdon bovista*, *A. procerus*, *Morchella esculenta*, *Boletus edulis*, *B. scaber*, *Lactarius deliciosus*, *Hydnum repandum*, *L. torminosus*, *H. imbricatum*, *Cantharellus cibarius*, *B. luteus*, *Sparassis crispa*, and *Polyporus ovinus*. The above order represents the relative proportion of *digestible* albuminoids, varying from 22·3 per cent of the dried substance in the first to 3·1 per cent in the last. But, in addition to this, there is a large quantity of *indigestible* albuminoids, amounting to as much as 16·7 per cent in *Lycoperdon bovista*, and 11·8 per cent in *Morchella esculenta*, and in many cases exceeding the amount of digestible nitrogenous constituents. Other nitrogenous constituents not of an albuminoid character—ammonium salts, amido-acids, etc.—are also invariably present, though usually in smaller quantities, the nitrogen in them representing from 0·21 to 2·49 per cent of the total dry weight of the fungus. The total result of these investigations is materially to reduce below the amount hitherto supposed the proportion of digestible constituents in edible fungi, and consequently their value as articles of food.

The writer further states that a hen's egg corresponds, in nutritive value, to 0·28 kgr. of *Agaricus campestris*, 0·73 of *Lactarius deliciosus*, 1·30 of *Cantharellus cibarius*, and 2·05 kgr. of *Polyporus ovinus;* 1 kgr. of beef contains as much nutriment as 9·3 kgr. of *Agaricus campestris*, 15·2 of *Morchella esculenta*, 24·2 of *Lactarius deliciosus*, 41·6 of *Cantharellus cibarius*, and 67·0 of *Polyporus ovinus*. The daily requirements of the body in digestible albuminoids (130 gr.) would be furnished by 5·7 kgr. of *Agaricus campestris*, 6·9 of *A. procerus*, 9·9 of *Boletus edulis*, 14·7 of *Lactarius deliciosus*, 26·3 of *Cantharellus cibarius*, and 41·6 of *Polyporus ovinus*.

The American Water Weed is the name applied in England to our small aquatic plant, *Anacharis canadensis*. This plant, after its introduction into Europe a few years ago, found itself so much at home that it began to choke up streams and lakes and make itself a nuisance to those who delight in boating. Dr. Barnes, of Hanover, now contends that it is not only not an unmixed evil, but an extremely valuable plant, since it destroys the germs of malaria and dysentery; and he recommends that it be introduced into waters where it does not already exist. He says that fish are always healthier where the plant abounds.

Modification of Plants by Climate.—Mr. Crozier, of Michigan University, in a paper on this subject, sums up his conclusions as follows:

"As plants move from the locality of their largest development toward their northern limit of growth, they become dwarfed in habit, are rendered more fruitful, and all parts become more highly colored. Their comparative leaf surface is often increased, their form modified, and their composition changed. Their period of growth is also shortened, and they are enabled to develop at a lower temperature."

A One Hundred and Forty-five Horse Power Whale.

Sir William Turner, the eminent Professor of Anatomy in the University of Edinburgh, recently delivered a lecture to the members of the Philosophical Institution of that city on "Whales, their Structure and Habits," in the course of which he referred to a point of considerable interest to engineers, which was the horse power exerted by the tail of a large whale. Regarding the length of full grown whales, Professor Turner remarked that the porpoise was 4 ft. or 5 ft. long, whereas the Greenland right whale was from 50 ft. to 60 ft. long, and he said that the great finner whale, which frequently visited the British seas, reached the length of 80 ft., or even more. An animal of the latter sort was stranded at Longniddry some years ago. After speaking at some length on the structure of whales, the lecturer made some remarks on the rate of speed at which they traveled. It had been estimated, he said, that the Greenland whale could attain a speed of nine or ten miles an hour, and that the finner whales attained even a greater speed. In all probability the Longniddry whale could propel itself through the water at the rate of twelve miles an hour, and the sperm whale was said to be capable of driving itself along at the same rate of speed. He had asked Mr. John Henderson, of Glasgow, the well-known builder of the Anchor liners, to assist him in arriving at the horse power which must be exercised by one of these great whales so as to acquire a speed of twelve miles an hour, and he put the case of the Longniddry whale before him. It was 80 ft. long, weighed about 74 tons, and had a tail 18 ft. to 20 ft. across from the extreme ends of its flanges. With these data Mr. Henderson calculated that a whale of the dimensions mentioned, in order to attain a speed of twelve miles an hour, would require to exercise a propelling force of 145 horse power.

The Effect of Strong Light upon the Eye.

The exposure of the eye to intense light has been attended with many curious and unfortunate results. In the case of Professor J. Plateau, of the University of Ghent, who while trying to observe the effects of irritation of the retina gazed steadily at the sun for twenty seconds, a chronic irido-choroiditis developed, which ended eventually in total blindness. Dr. J. A. Andrews, in an article upon this subject (*Trans. of Amer. Ophthalmol. Soc.*, 1886), collects a number of cases in which choroiditis and retinitis occurred in persons who had observed an eclipse of the sun. The single flash of a sun reflector has been known to cause retinitis. Scotomata, amblyopia, and other temporary visual disturbances of a functional character have been frequently noted. M. Reich has described a curious epidemic of snow blindness which occurred among a body of laborers engaged in clearing a way through masses of snow which obstructed the road between Passanaur and Mleti, in the Caucasus. The rays of the sun, reflected from the vast stretches of snow on every side, produced an intense glare of light, which the unaccustomed eye could not support without the protection of dark glasses.

A few of the sturdiest among the laborers were able to work with impunity, but the majority, and especially the weakly and anæmic, suffered severely in their eyes, in spite of the various devices to protect them from the light. Among seventy strongly marked cases, thirty were so severe that the men were absolutely unable to continue their work or to find their way home. They were collected in a covered place, where Reich found them on his arrival prone on their faces, striving to hide their eyes from the light, and crying out from pain. Photophobia was present in all the cases. Hyperæmia of the conjunctiva, with more or less injection of the ciliary vessels, and even chemosis, was found in all severe cases. Recovery was gradual, but complete. Dr. W. C. Rockliffe (*Ophthal. Rev.*, September, 1882, quoted by Dr. Andrews) records a case of acute conjunctivitis brought on by exposure of the eyes to a 3,000 candle power electric light. Dr. Emrys-Jones and Dr. David Little have both reported instances showing that workmen or others who expose the naked eye to an arc light of great intensity are liable to have conjunctivitis, as well as more serious ocular disturbances. It is estimated that exposure of the naked eye for one minute to an arc light of 2,000 candles will cause conjuctivitis. The violet or orange lights are said to be less injurious than the normal white light.

The light of lightning is too transient to cause any injury from simple retinal over-irritation; but it is known that cataracts sometimes follow lightning strokes, and these are believed to be produced by some physico-chemical influence.

Glass blowers suffer from an opacity of the lens brought on, not by the light, but the intense radiant heat (148° F.) to which they are exposed during their work. Dr. Andrews found such opacities in 4·5 per cent of men under thirty-eight years of age, and 20 per cent in men above that age. Dr. Meyhoefer found 9 per cent among men under forty.

Of all forms of artificial illumination, the incandescent electric light, so far as facts now go, is the best. Among 1,100 persons who worked by this light, Dr. Andrews found not a single case of injury. On the other hand, many persons testified to the fact that they could work longer by it with less fatigue than with the gas or oil light. This is due, it is found, to the steadiness, absence of heat, and perhaps the greater proportion of violet rays. Short-sighted persons are, in particular, benefited by the use of the incandescent lamp. —*Medical Record.*

The Spheroidal State of Water as Seen in Glass Works.

The spheroidal state of water has long formed a favorite object for experimentation by lecturers. It consists in protecting a liquid from contact with a hot surface, by interposing between the two a layer of gaseous molecules. These are supposed to oscillate back and forth, forming a "Crookes layer," and keeping the two separate. The molecules are assumed to enter into the same state in which the rarefied gas in the radiometer or Crookes vacuum tubes exists. The paths of vibration of the molecules are supposed to bear some tangible relation in length to the distance separating the boundary surfaces. Many of the experiments with heated metals or fluids, in which the operator seems to be proof against heat, are founded upon this phenomenon. By having the skin properly protected by a layer of steam or other vapor, hot metals and boiling water will have no effect upon it as long as the protective layer is maintained.

In glass works the spheroidal state of water is sometimes illustrated on a large scale. In making colored glass, such as ruby glass, in which gold is the base of the coloring agent, it is often necessary to remelt the charge. The pot of melted metal is emptied by ladling, and the melted glass is poured into water.

A barrel of water is placed upon the floor near the opening of the pot, and the workman with an iron ladle pours the melted glass into the water. It at once sinks, and, owing to its intense degree of heat, becomes surrounded by an atmosphere or thin layer of steam. The water does not touch it, and hence is but slightly heated. The surface remains quiet, and the depths of the water glow with a diffused red light. After a while the glass cools, the water comes in contact with it and bursts into rapid ebullition. Even this ebullition is less violent than would have been anticipated, owing to the non-conducting power of the glass. As soon as a small thickness becomes cool, it protects the center of the mass.

If a few ladles are emptied into a bucket of water, the effect is far more striking. The red hot glass can be seen lying in a mass, as large as a cocoa nut, quietly at the bottom of the pail. It reminds one of the red hot pellets of magnetic oxide of iron that can be seen under water in the oxygen combustion of iron wire. It is most impressive to see the great lump of glowing glass maintaining its full heat under the comparatively cold water. This state of things may last for a minute or more before the water boils.

PHOTOGRAPHIC NOTES.

Method of Discharging the Yellow Color from Platinum Prints.—The *Photo. News* suggests that the supposed yellow color noticeable in platinotype prints, and recently attributed by some authorities to the action of sulphureted hydrogen on the iron salts, is not actually so, as was recently proved by a series of experiments, where the print was held in strong sulphureted hydrogen gas, and was not in the least affected. The real cause was the turning of the paper itself, which gave the yellow appearance to the whites of the picture.

By immersing the discolored print in a bath of weak chlorine water or a weak acidified solution of bleaching powder, the yellow tint is at once removed, bringing the print back to its original vigor.